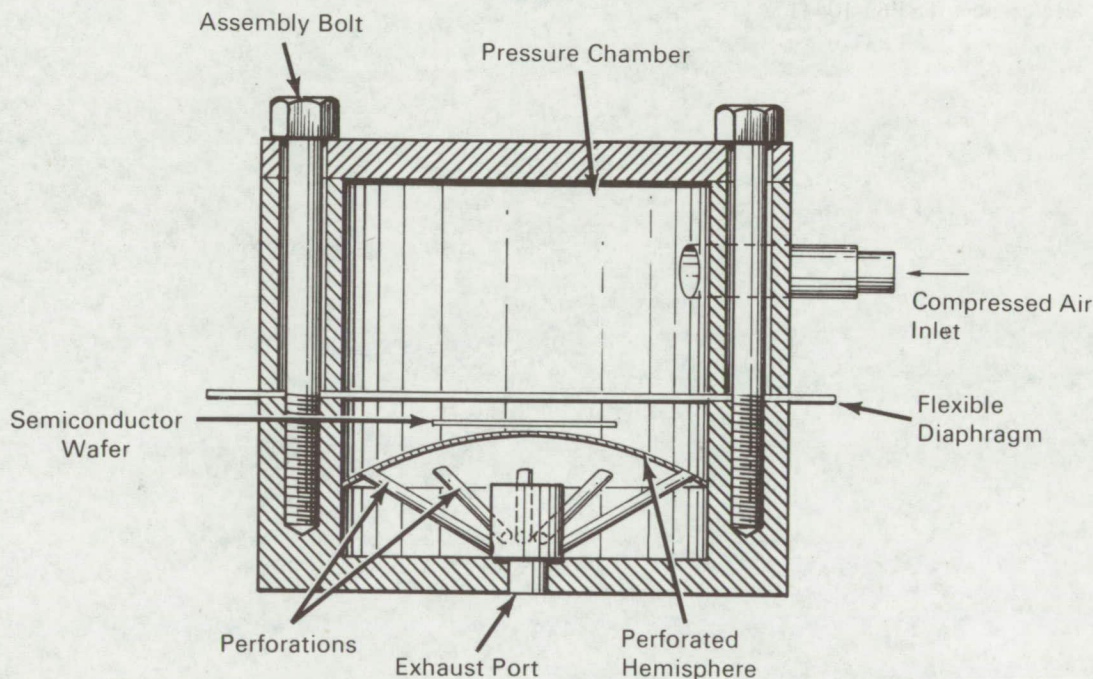


NASA TECH BRIEF



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Improved Method of Dicing Integrated Circuit Wafers into Chips



A method has been devised for dicing a semiconductor single-crystal wafer, which contains integrated circuits, into small chips along pre-scribed lines without damaging the circuits. The dicing operation employs the convex portion of a perforated hemisphere on which the scribed wafer is positioned, face up, in a chamber containing a thin flexible diaphragm supported above the wafer. When air pressure is suddenly applied above the diaphragm, the uniformly transmitted stress bends the wafer to conform to the convex surface of the hemisphere. As a result of this bending, the wafer breaks cleanly into individual chips along the scribed lines.

In experiments with this method, rectangularly scribed 1.25-inch-square wafers ranging in thickness from 0.006 to 0.011 inch were diced into chips (along the scribed lines) of the following sizes: 0.040x0.070, 0.050x0.060, 0.060x0.060, and 0.070x0.070 inch. These chips were produced using a hemisphere having a radius of 5.0 centimeters, a 0.018-inch-thick rubber diaphragm, and a chamber pressure of 120 psi. In addition to the usual rectangular chips, triangular chips, 0.07-inch on each side, were successfully produced.

The advantages of this method over previous methods are: (1) All chips are held in place during

(continued overleaf)

the operation so that they cannot slide over each other and scratch the surface patterns. (2) Flaking and dust formation are minimized. (3) No special operator skill is required.

Notes:

1. Smaller chips could be produced using hemispheres of smaller radii.
2. The processing speed has been increased by replacing the bolt-locked cover with a hinged cover having a quick-acting clamp.
3. Documentation is available from:
Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Price: \$3.00
Reference: TSP69-10441

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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